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(54) **PILOT TRACKING FOR SYNCHRONIZATION USING CORRELATION BETWEEN DIGITAL SIGNAL AND LOCALLY GENERATED VERSION OF PN SIGNAL**

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(52) **U.S. Cl.** **375/150**

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See application file for complete search history.

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(57) **ABSTRACT**

A method of tracking a pilot channel to discipline an oscillator includes: downconverting the RF signal to a low frequency that is of the order of, but greater than the chip rate; converting the signal into digital format; computing complex correlations between the received digital signal and local replicas of the PN codes; and establishing from the correlation values what is the nominal frequency error of the local oscillator. Correlation values between the digital signal {s(n)} and at least one locally generated version of I-channel and Q-channel PN signals $\{I_{PN}(n)\}$ and $\{Q_{PN}(n)\}$ are averaged over multiple periods of the PN signals. Pilot signal tracking accuracy is improved, computational load is reduced without degradation in performance, and the technique is simple enough to be incorporated in an off-the-shelf FPGA.

53 Claims, 8 Drawing Sheets